4.2. Adaptation to Climate Change in the Drylands of West Africa[11] (Ton Dietz[12])

Based on climate analysis for the 1960-1994 period variability was shown to be high, and between 1970 and 1985 with a major downward trend in the Sahel, but after 1985 an upward trend again. Comparing 1930-1960 and 1960-1994 a major shift in aridity zones southward could be proven. Based on climate predictions for 1990-2030: increased drought risk and further aridity shift southward.

The social impact study of this variability and negative trend was based on intensification theory, with attention to the portfolio of options: direct food intensification, indirect food intensification (via external markets, using positive caloric and other terms of trade), marketing of non-agricultural products, and services, selling labour (sending remittances), social security arrangements, improved food storage, stealing food, and lowering food demands). It could be seen that as a trend, and during drought years in particular, the first two options become less important, and all others become more important.

It is important to differentiate risks of climate change. Climate change means a gradual change to higher temperatures and hence higher evapotranspiration; changing rainfall regimes; change of ecozones, agro-ecozones, and biodiversity and crop niches, with impact on livelihood options; and higher chances of extreme weather events (droughts, floods, storms). Types of risks: species extinction; human and animal death; damage to property and physical infrastructure; threatened livelihoods; lower resilience; lower innovative capability, and lower (insurance) buffers.

The Sahel has always been a vulnerable agricultural, livestock and now increasingly mixed agricultural area, with increasing drought-prone conditions. People have developed 'normal' seasonal and general coping mechanisms, and an adaptation capability, with 'normal' support networks. The major challenging research and policy question is: what happens during more extreme conditions? Attention should also be given to the social differentiation of the impact of drought: increased vulnerability hits the poor more than the rich, but the poor are more risk-averse, and have less taboos with regard to extreme coping behaviour. Extreme shocks/disasters can devastate the rich as well as the poor. But the rich are generally better protected physically, socially and economically. Diversification is a key strategy. However, the poor have a poverty-driven diversification profile and the rich an opportunity driven diversification profile. Both the rich and the poor have multi-spatial and multi-sector livelihoods, but middle-level wealth groups are most vulnerable to shocks. Particularly vulnerable are one-place, economic specialists, dependent on external markets, and with relatively low buffers. To study these trends a vulnerability framework was used and a pathway analysis was made (See Figure 4).

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[11] Based on the results of the ICCD Project, funded by the Netherlands Research Programme on Global Air Pollution and Climate Change; a collaboration between CERES, Wageningen UP, RIVM, and West African scholars, coordinated by Ton Dietz, Ruerd Ruben and Jan Verhagen, with as its major result a book, *The impact of climate change on drylands, with a focus on West Africa*; Kluwer academic publishers 2004. Also submitted to Disasters.

[12] University of Amsterdam

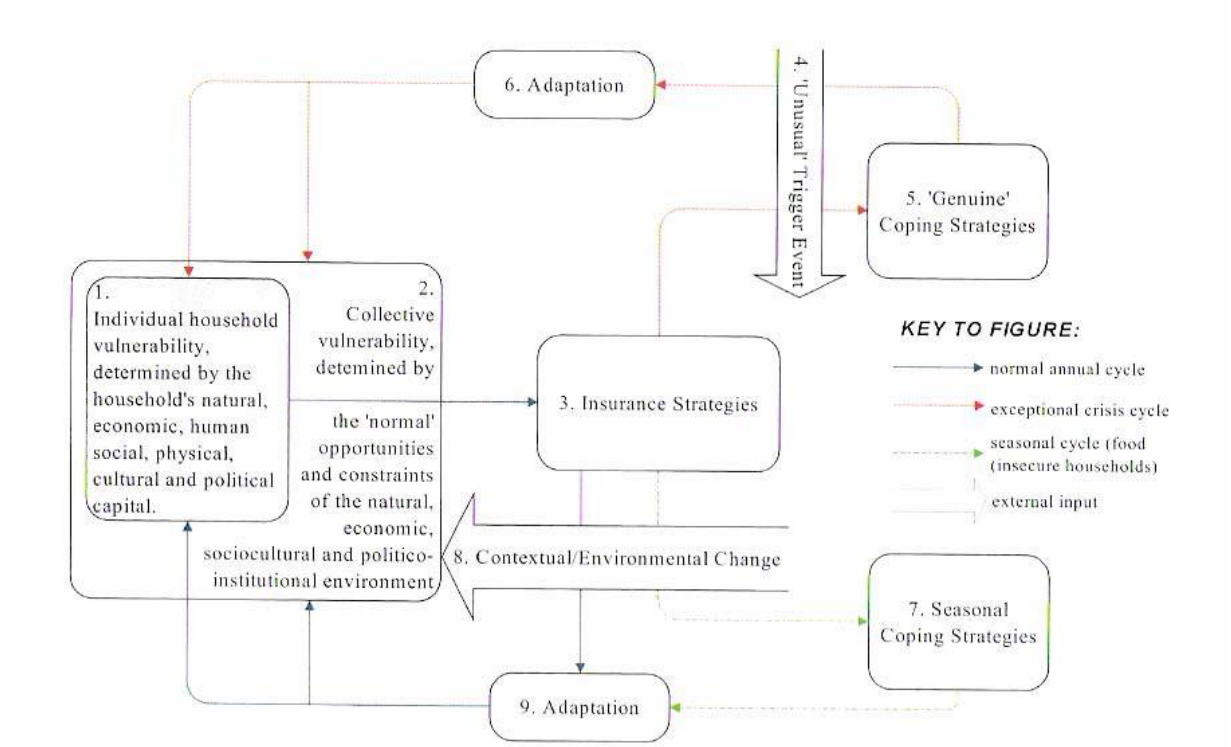

Figure 4: Conceptual framework: Farm household vulnerabilities and responses to normal opportunities and constraints, unusual events and changing conditions (Taken from the presentation of Ton Dietz).

As an example northern Ghana was presented. Indeed, there are strong signs of climate deterioration and changing behaviour there. The evidence given was: dryer natural environment: more ´northern´ species, traditional species disappear (including some important economic trees); lower reliability of the seasons; shift towards later start of the planting season; more dry weeks during the agricultural season; more sudden floods; more early-maturing, drought tolerant varieties, shift to riverine fields and fields in former marsh lands; more diversified portfolio of fields; more seasonal rivers; earlier stagnant water pools (malaria!); more salty water sources; growing importance of goats; higher reliance on irrigation and on niche crops (onions, tomatoes); shifts to other water-harvesting methods; southern shift of the cotton belt; and water table in wells lower. There is a strongly increased farmers' willingness to invest in soil and water enhancing environmental management and on-farm tree planting, higher labour input and during bad seasons a shift from cereals to legumes. There is much higher dependence on remittances from elsewhere; a much higher migration (seasonal and casual, but also permanent) to 'down south', even during the cropping season at home ('hunger trips') and much more emphasis on social networks and social security arrangements, as well as a more powerful position of rich families.
Attention should be given to the massive redistribution of people in West Africa (and in Africa as a whole), with very fast urbanisation, emptying of problem areas, and >400% increase of the population of most of the coastal area since the 1960s. Many of the poverty and vulnerability problems are also urban now, and directly and indirectly linked to the problems of drought, and climate change in the drylands of the continent. Understanding migration is very important as part of studying people's adaptations.

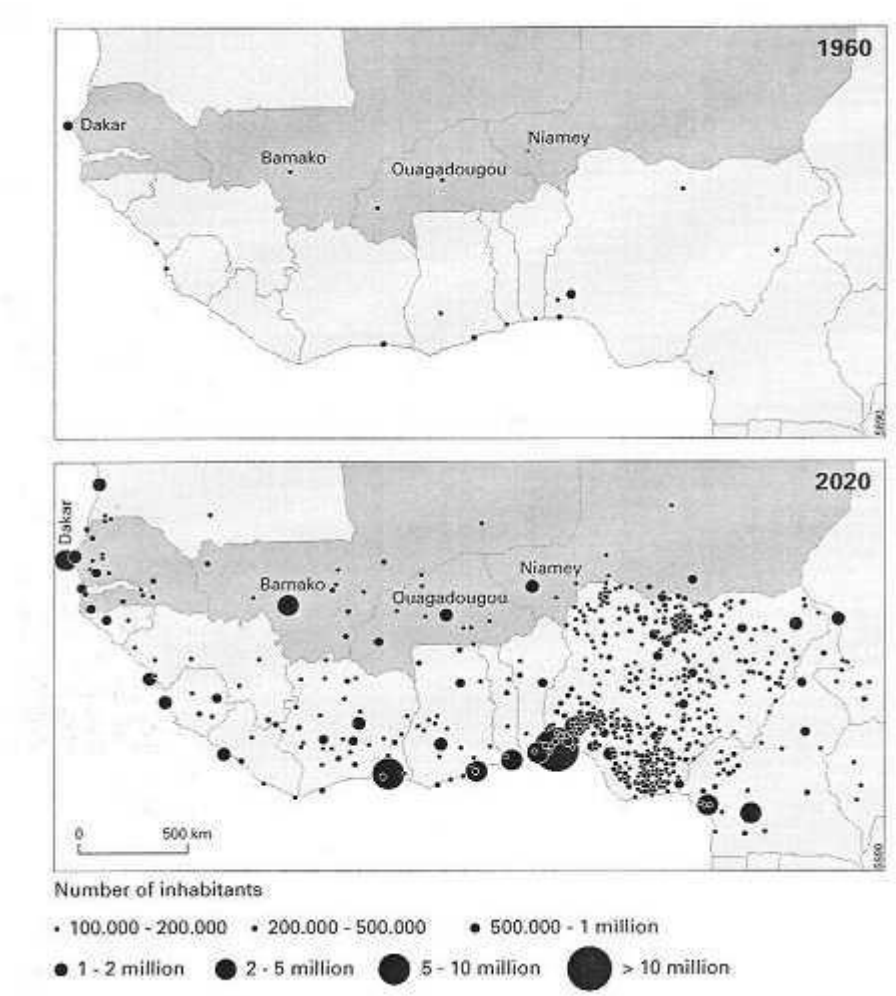

Figure 5: Urbanisation in Western Africa, 1960 and 2020 (taken from the presentation of Ton Dietz).

Urbanisation prospects until 2020 are alarming. The worrying thing is the speed of urbanisation and the weak economic basis, rural poverty becomes extreme urban poverty. Population with general education who can't get any job use their intellect to join the problematic informal sector. Due to this massive urbanisation, the problems will be urban not rural in 2020 (See Figure 5).

Finally the results of a prioritisation exercise were summarised, Sahelian scholars played a key role, in this exercise, which was done as part of the ICCD project.
Policy priorities, according to a West African expert panel:

- Better early warning systems and better communication;
- Integrate knowledge about changing nature and changing behaviour;
- Develop more adaptive agricultural, pastoral, sylvicultural and horticultural practices (and support 'northern nature and crops' moving south);
- More attention to and support for social security networks and for diversified livelihood profiles;
- More attention to migration and to the role of remittances;
- More attention to entitlement changes (e.g. land, water and forest rights) and to conflict prevention between groups with different identities (e.g. cultivators vs. herders).